REMARKS

The proposed changes are requested to place the present application in form acceptable to the United States Patent and Trademark Office. Applicants respectfully submit that the requested amendments do not add any new matter into the present application.

No fees are believed to be due in connection with this Preliminary Amendment. However, if it has been determined that a fee is due, please proceed to debit our Deposit Account No. 13-0235 accordingly.

Respectfully submitted,

By _____

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In the Specification:

Please amend the specification as follows:

[0050] Fig. 1 shows a power transmission device for a vehicle to which the present invention is applied. As shown in the drawing, a clutch mechanism 1 is provided between an engine E and a transmission T/M. The clutch mechanism 1 ~~is constituted by~~ comprises a fluid coupling 2 provided on the upstream side in the power transmission direction, and a gear shift clutch 3 provided in series therewith on the downstream side thereof and constituted by a friction clutch which in this embodiment is a wet type multiple disk clutch. What is noted here as a fluid coupling is a broad concept including a torque converter, and in actual fact a torque converter is used in this embodiment. The vehicle to which the present invention is applied is a comparatively large vehicle such as a truck. The engine E is a diesel engine.

[0076] In the one-shot engagement control in this case, however, the starting duty is further toward the engagement side than is ~~conventionally~~ conventional and is outputted for a shorter amount of time than is conventional ~~conventionally~~. In so doing, the duty value is further toward the engagement side, and thus the amount of oil supplied to the clutch increases such that the clutch can be operated to the engagement side more ~~speedily~~ rapidly. As ~~conventionally~~ conventional, on the other hand, the clutch itself must be stopped just before the torque point, and hence a waiting period Δtst at which this occurs is set by a time experiment. Thus a similar form of one-shot engagement to that performed conventionally can be achieved in a shorter amount of time, whereby the clutch engagement time can be reduced while preventing clutch engagement shock.

[0079] Following one-shot clutch engagement control, processing moves to ~~loose~~ loosen clutch engagement control (t3). That is, a loose engagement duty Dk_{ι} at which the clutch 3 is loosely engaged$_{\iota}$ is outputted from the ECU 16 at predetermined time intervals. In this embodiment, the predetermined time is equal to a control cycle Δt = 20msec. However, this time may be made equal to a

plurality of control cycles nΔt. This predetermined time will be referred to as a loose engagement cycle hereinafter.

[0083] The specific content of clutch loose engagement control is as follows. First, in the loose engagement cycle at a time t3, a loose engagement duty Dk3 is outputted as an initial value. The value of this loose engagement duty Dk3 is slightly further toward the engagement side than the torque point learned value. Then, the rotational difference ΔN3 at this time is calculated and the step duty Ds3 is determined from the current gear stage and the value of ΔN3 in accordance with the map in Fig. 8. Then, in the next loose engagement cycle at a time t4, which is the next control cycle, a value, which is obtained by subtracting the step duty Ds3, from the previous loose engagement duty Dk3 is set as a loose engagement duty Dk4 for this cycle, and this value is outputted from the ECU 16. Likewise, the rotational difference ΔNn is calculated in the loose engagement cycles at times tn (n=4, 5, 6...), the step duty Dsn is determined in accordance with the map in Fig. 8, the step duty Dsn is subtracted from the previous loose engagement duty Dkn in the next loose engagement cycle at a time tn+1, which is the next control cycle, the value thereof is set as the current loose engagement duty Dkn+1, and this value is outputted from the ECU 16. By repeating this control in such a manner, the clutch is gradually engaged and the rotational difference ΔN gradually becomes smaller.

[0087] Next, a process performed during a garage shift will be described using Figs. 7 and 10. In Fig. 7, times before the time t1 indicate a stationary state prior to advance in which the gear is in neutral, a braking operation is being performed, the engine is idling, the gear shift clutch 3 is engaged, the lockup clutch 7 is disengaged, and the output of the engine is transmitted to the countershaft 10 and main gears M1... of the transmission T/M via the fluid coupling 2 and the gear shift clutch 3. This is in order to agitate mission oil which is accumulated inside the transmission T/M through the rotation of the counter gears 12... to cause an increase in temperature. At this time, the engine rotational frequency Ne, turbine rotational frequency Nt, and input shaft rotational frequency Ni are all equal.

[0134] Note that at low speeds a certain amount of time is required for a fixed number of pulses to accumulate, and therefore gear stage detection may take longer than is ~~conventionally~~ conventional. However, gear stage detection can be performed far more accurately than in the past, and the merits thereof are ~~large~~ substantial. At high speeds, meanwhile, pulses accumulate momentarily, and therefore gear stage detection can be performed rapidly.

[0155] Control is started 50, and then, in a step 4, a determination is made as to whether ~~or not~~ the meter gear ratio has been learned. If a flag is raised as noted above, it is determined that the ratio has been learned (yes), and then, in a step 5, a determination is made as to whether ~~or not~~ twenty-five pulses have been inputted from the vehicle speed sensor. If twenty-five pulses have been counted (yes), a determination is made in a step 6 as to whether ~~or not~~ the pulse count number of the transmission rotation sensor has been obtained. If the number has been obtained (yes), the gear position is determined from the map which is selected from Figs. 17 and 18 by means of a map search ~~+~~ and the known meter gear ratio.